

Listing of the Claims

1. (currently amended) A method for concealing errors detected in an input digital audio bit stream, the ~~digital~~ audio bit stream configured as a series of ~~packets~~ frames, said method comprising the steps of:

detecting a first beat and a subsequent plurality of beats in the audio bit stream;

defining a first inter-beat interval extending between said first beat and a $(k+1)^{\text{th}}$ subsequent beat;

storing at least a portion of the audio bit stream occurring within said first inter-beat interval;

detecting an erroneous audio segment occurring in a second inter-beat interval extending between said $(k+1)^{\text{th}}$ beat and a $(2k+1)^{\text{th}}$ subsequent beat; and

replacing at least a first part of said erroneous audio segment with a corresponding part of said stored ~~digital~~ audio bit stream portion, wherein the corresponding part is selected based on a time relationship between the first part and one of the $(k+1)^{\text{th}}$ and $(2k+1)^{\text{th}}$ beats.

2. (original) A method as in claim 1 wherein 'k' is an integer greater than or equal to 2.

3. (currently amended) A method as in claim 1 wherein said stored audio bit stream portion includes at least one ~~packet~~ frame positioned on at least one of said ~~beat~~ beats.

4. (original) A method as in claim 1 wherein said step of detecting a first beat comprises a step of computing the variance of the audio bit stream using decoded IMDCT coefficients.

5. (currently amended) A method as in claim 1 wherein said step of detecting a first beat comprises ~~the~~ a step of utilizing a window-switching pattern.

6. (original) A method as in claim 1 wherein said step of detecting a first beat comprises a step of computing the envelope of the audio bit stream using decoded IMDCT coefficients.

7. (currently amended) A method as in claim 1 wherein said step of detecting a first beat comprises ~~the~~ steps of computing the variance of the audio bit stream using decoded IMDCT coefficients and utilizing a window-switching pattern.

8. (original) A method as in claim 1 wherein said step of storing at least a portion of the audio bit stream includes a step of storing said portion in a circular first-in first-out (FIFO) buffer.

9. (canceled)

10. (currently amended) A method as in claim 9 1 wherein ~~said signal having repetitive sequences comprises at least one signal from the group consisting of~~ the audio bit stream includes a music signal ~~and an audio signal~~.

11. (canceled)

12. (currently amended) A method as in claim 9 1 wherein ~~said signal having repetitive sequences includes~~ the erroneous audio segment is the result of at least one of a packet loss from an IP network and a burst error from a wireless channel.

13.-15. (canceled)

16. (currently amended) A method as in claim 9 1 further comprising the step of replacing one ~~said~~ beat with another ~~said~~ beat from a preceding bar.

17. (canceled)

18. (canceled)

19. (new) A method as in claim 1, wherein the first part has a time displacement τ from one of the $(k+1)^{\text{th}}$ and $(2k+1)^{\text{th}}$ beats, and wherein the corresponding part is selected so as to have the same time displacement τ from one of the first and $(k+1)^{\text{th}}$ beats.

20. (new) A method as in claim 1, further comprising:
determining a confidence score, the confidence score being a percentage of correct beat detection within an observation window; and
discontinuing said replacing step when the confidence score is below a threshold value.

21. (new) A method as in claim 1, further comprising estimating an inter-beat interval according to the formula

$$IBI_i = IBI_{i-1} * (1-\alpha) + IBI_{new} * \alpha ,$$

wherein IBI_i is a current estimation of the inter-beat interval, IBI_{i-1} is a previous estimation of the inter-beat interval, IBI_{new} is a most recently-detected inter-beat interval, and α is a weighting parameter.

22. (new) A method as in claim 1, wherein said storing comprises minimizing storage requirements by only storing frames adjacent to a strong beat or to an offbeat.

23. (new) A method as in claim 1, further comprising replacing a corrupted audio frame by interpolating preceding and succeeding audio frames.

24. (new) A method as in claim 1, further comprising replacing a second part of the erroneous audio segment preceding the first part of the erroneous audio segment with a frame preceding the second part.

25. (new) A method as in claim 1, further comprising replacing a second part of the erroneous audio segment following the first part of the erroneous audio segment with a frame following the second part.

26. (new) A method as in claim 1, further comprising:
replacing a second part of the erroneous audio segment preceding the first part of the erroneous audio segment with a frame preceding the second part; and
replacing a third part of the erroneous audio segment following the first part of the erroneous audio segment with a frame following the third part.

27. (new) A method as in claim 5, wherein said detecting a first beat and a subsequent plurality of beats further comprises:
detecting strong beats and off-beats, and
determining an interval between strong beats based on a statistical probability of inter-beat intervals.

28. (new) A method as in claim 27, wherein said detecting a first beat and a subsequent plurality of beats further comprises:

determining the interval between strong beats based on a most probable inter-beat interval of approximately 600 ms.

29. (new) A wireless terminal comprising:

a receiver section having a beat detector and an audio decoder, wherein the receiver section is configured to perform steps comprising

detecting a first beat and a subsequent plurality of beats in an audio bit stream,

defining a first inter-beat interval extending between said first beat and a $(k+1)^{\text{th}}$ subsequent beat,

storing at least a portion of the audio bit stream occurring within said first inter-beat interval,

detecting an erroneous audio segment occurring in a second inter-beat interval extending between said $(k+1)^{\text{th}}$ beat and a $(2k+1)^{\text{th}}$ subsequent beat, and

replacing at least a first part of said erroneous audio segment with a corresponding part of said stored audio bit stream portion, wherein the corresponding part is selected based on a time relationship between the first part and one of the $(k+1)^{\text{th}}$ and $(2k+1)^{\text{th}}$ beats.

30. (new) The wireless terminal of claim 29, wherein 'k' is an integer greater than or equal to 2.

31. (new) The wireless terminal of claim 29, wherein said stored audio bit stream portion includes at least one frame positioned on at least one of said beats.

32. (new) The wireless terminal of claim 29, wherein said step of detecting a first beat comprises a step of computing the variance of the audio bit stream using decoded IMDCT coefficients.

33. (new) The wireless terminal of claim 29, wherein said step of detecting a first beat comprises the step of utilizing a window-switching pattern.

34. (new) The wireless terminal of claim 29, wherein said step of detecting a first beat comprises a step of computing the envelope of the audio bit stream using decoded IMDCT coefficients.

35. (new) The wireless terminal of claim 29, wherein said step of detecting a first beat comprises steps of computing the variance of the audio bit stream using decoded IMDCT coefficients and utilizing a window-switching pattern.

36. (new) The wireless terminal of claim 29, wherein said step of storing at least a portion of the audio bit stream includes a step of storing said portion in a circular first-in first-out (FIFO) buffer.

37. (new) The wireless terminal of claim 29, wherein the audio bit stream includes a music signal.

38. (new) The wireless terminal of claim 29, wherein the erroneous audio segment is the result of at least one of a frame loss from an IP network and a burst error from a wireless channel.

39. (new) The wireless terminal of claim 29, wherein the first part has a time displacement τ from one of the $(k+1)^{\text{th}}$ and $(2k+1)^{\text{th}}$ beats, and wherein the corresponding part is selected so as to have the same time displacement τ from one of the first and $(k+1)^{\text{th}}$ beats.

40. (new) The wireless terminal of claim 29, wherein the receiver section is configured to perform steps comprising:

determining a confidence score, the confidence score being a percentage of correct beat detection within an observation window, and

discontinuing said replacing step when the confidence score is below a threshold value.

41. (new) The wireless terminal of claim 29, wherein the receiver section is configured to perform steps comprising:

estimating an inter-beat interval according to the formula

$$IBI_i = IBI_{i-1} * (1-\alpha) + IBI_{new} * \alpha ,$$

wherein IBI_i is a current estimation of the inter-beat interval, IBI_{i-1} is a previous estimation of the inter-beat interval, IBI_{new} is a most recently-detected inter-beat interval, and α is a weighting parameter.

42. (new) The wireless terminal of claim 29, wherein said storing comprises minimizing storage requirements by only storing frames adjacent to a strong beat or to an offbeat.

43. (new) The wireless terminal of claim 29, wherein the receiver section is configured to perform steps comprising:

replacing a corrupted audio frame by interpolating preceding and succeeding audio frames.

44. (new) The wireless terminal of claim 29, wherein the receiver section is configured to perform steps comprising:

replacing a second part of the erroneous audio segment preceding the first part of the erroneous audio segment with a frame preceding the second part.

45. (new) The wireless terminal of claim 29, wherein the receiver section is configured to perform steps comprising:

replacing a second part of the erroneous audio segment following the first part of the erroneous audio segment with a frame following the second part.

46. (new) The wireless terminal of claim 29, wherein the receiver section is configured to perform steps comprising:

replacing a second part of the erroneous audio segment preceding the first part of the erroneous audio segment with a frame preceding the second part, and

replacing a third part of the erroneous audio segment following the first part of the erroneous audio segment with a frame following the third part.

47. (new) The wireless terminal of claim 33, wherein said detecting a first beat and a subsequent plurality of beats further comprises:

detecting strong beats and off-beats, and

determining an interval between strong beats based on a statistical probability of inter-beat intervals.

48. (new) The wireless terminal of claim 47, wherein said detecting a first beat and a subsequent plurality of beats further comprises:

determining the interval between strong beats based on a most probable inter-beat interval of approximately 600 ms.

49. (new) The wireless terminal of claim 29, wherein the receiver section is configured to perform the step of replacing one beat with another beat from a preceding bar.